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Via Po, 53 – 10124 Torino (Italy)  
Tel. (+39) 011 6704917 - Fax (+39) 011 6703895  
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## WORKING PAPER SERIES

### THE EUROPEAN FIRM

Alessandra Colombelli e Francesco Quatraro

Dipartimento di Economia "S. Cagnetti de Martiis"

LEI & BRICK - Laboratorio di economia dell'innovazione "Franco Momigliano"  
Bureau of Research in Innovation, Complexity and Knowledge, Collegio Carlo Alberto

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# The European Firm

Alessandra Colombelli<sup>a,b</sup> and Francesco Quatraro<sup>b,c</sup>

- a) CRENOS, University of Cagliari, Cagliari, Italy
- b) BRICK, Collegio Carlo Alberto, Moncalieri, Italy
- c) Université de Nice Sophia Antipolis, GREDEG-CNRS, Valbonne, France

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## 1 Introduction

The organization of production has represented a key issue to economics scholars since Adam Smith's *Wealth of Nations* (1776). The example of the pin factory or the one concerning the improvements in steam engines, already called for the importance of division of labor, organization of production and the relationships between process and organizational innovations. Later on, Alfred Marshall's *Principles of Economics* (1890) and *Industry and Trade* (1919) provided an analysis of the organization of production within different industrial contexts, comparing different national systems.

However, business organization began to be included in a well defined field of enquiry only in the late 1930s, i.e. the theory of the firm. While the former approaches (Coase, 1937) were much interested in establishing a neo-classical basis to the theory of the firm, in the 1960s there was a change in the intellectual climate influencing the development of the discipline, leading to the introduction of the so-called managerial and behavioral theories, and then to the transaction costs approach proposed by Williamson.

The shift away from the neo-classical approach to the theory of the firm was much influenced by the increasing awareness that the post-war international economy was farther and farther from a perfect competition situation. The use of markets ceased to appear as costless, and it was clear that in many countries, like France, Germany and the United States, firms appeared more as large corporations carrying out many, if not all, of the stage of the production process, rather than as tiny and non-influential productive units. The evidence provided by Alfred Chandler (1962 and 1977) demonstrated that the industries that benefited from the technological system characterizing the so-called Second Industrial Revolution showed larger and capital intensive production units, able to pursue scale and scope economies so as to gain higher profit margins. The US large and diversified corporation, organized as multi-divisional hierarchy, was seen as a sort of optimum towards which all industrial systems should have converged sooner or later in order to retain competitiveness and stay in the market.

Such stream of literature represents the first attempt to identify an ideal type of firm, on the basis of which clear prescriptions could have been formulated. In the mid 1980s the interest of business historians began to move towards the analysis of the distinctive features characterizing Japanese firms (Aoki, 1990; Aoki and Dore, 1994). The phenomenology of the Japanese firms has then been studied under different perspectives, emphasizing the specificity of their internal structure as well as the structure of the network of relationships in which they operate, made up of both economic and institutional actors. A pretty interesting picture has then emerged that on the one hand shed light, at least in part, on the reasons underlying their success, and on the other hand provided new challenges to the theory of the firm (see the chapter by Lechevalier in this book).

More recently, a new stream of literature appeared, following the increasing integration of European countries and globalization of European firms. The emergence and the gradual hardening of the Single European Market raised the important issue as to what should be the future of business organization for European firms. On the one hand, scholars have maintained that the chance to confront with larger and larger markets should lead to the establishment of a sort US-like European multidivisional firm, able to get significant rents due to market power and technical economies of scale. On the other hand, the increasing literature showing the advantages of outsourcing and of networking firms proposed flexible and specialized firms as the model towards which industrial systems in Europe should have converged. A different approach to the issue has been synthesized in a recent volume edited by Richard Withley and Hull Krinstensen (1996), the contributions of which set out a framework based on social contingency and social choice. According to this strand of literature, a unique ideal-type of European firm can hardly be devised, due to the social, political and institutional variety that characterizes the different European countries. Moreover, similar economic agents in different economic contexts may be motivated by different objectives, so that the analysis of economic choices would not be necessarily the same.

The purpose of this chapter is to provide an extended overview on the debate on the European firm, by articulating it against the backdrop of more traditional theories of the firm. The chapter also proposes a different interpretation of the issue by grafting the discussion into the interpretative framework of complexity theory, so as to provide a new and possibly richer heuristic. The rest of the chapter is organized as follows. Section 2 provides a review of main theories of the firm, from early neo-classical to more recent evolutionary approaches. In Section 3 we go into the debate about the perspectives for a European firm, emphasizing the importance of local idiosyncratic factors in shaping the technology of production. We will argue that key economists like Alfred Marshall, Simon Kuznets and Joseph Schumpeter already provided the bases for a contingency-based approach. Section 4 develops a complexity approach to the issue of the European firm from a dynamic viewpoint, while Section 5 presents the conclusions and suggests possible avenues for future research.

## 2 Theories of the firm: an overview

### 2.1 The neoclassical theory of the firm

In the Neoclassical Theory, the firm is conceptualized as a black box rational entity. The theory builds upon production and demand functions where the firm is described as a production function which transforms inputs into outputs. According to this theory, the firm maximizes its profit under the assumption of perfect rationality.

The main limit of this theory is that it does not take into account the internal structure of the firm conceived as a black box. It does not help in explaining how production is organized and governed or how profit maximization is achieved. Moreover, traditional economic analysis neglects the boundaries of the firm and, consequently, does not help in explaining what determines vertical or horizontal integration. It also neglects the conflict of interests between economic actors arising from asymmetries of information as it assumes complete information. Finally, it mainly deals with static equilibrium analysis and thus does not account for firms dynamics.

### 2.2 The transaction costs theory of the firm

In transaction costs economics the firm is not described as a production function but is conceptualized as a governance structure. This theory is based on the assumption of bounded rationality and opportunism. One of the main contributions of the transaction costs view is that it tries to go inside the black box and understand the firm's internal structure. In particular, the transaction costs theory focuses on the make-or-buy decision in the context of vertical integration.

In his pioneer article *The Nature of the Firm* Coase developed the approach to the theory of the firm based on transaction costs. According to Coase, within a firm market transactions based on price mechanisms are eliminated and the production is coordinated by the entrepreneur. "A firm consists of the system of relationships which comes into existence when the direction of resources is dependent on an entrepreneur" (Coase 1937, p. 393). In this view, the entrepreneur coordinates transactions with the aim of minimizing his costs function. Thus, a firm emerges when the costs of production factors are lower if a certain transaction is carried out within the firm rather than in the open market. Yet, the exact nature of transactions is not well specified by Coase.

The contribution of Oliver Williamson to this theory is important in that has gone in-depth the analysis of transaction costs that determine the decision to make or buy and has described the main governance structures of transactions. According to Williamson, three main attribute helps in describing transactions: "the frequency with which transactions recur, the uncertainty – disturbances - to which they are subject, and the condition of asset specificity" (Williamson, 1998, p. 36). In this view, a firm decides to vertically integrate when transactions are frequent, have high uncertainty because of information asymmetries and involve highly specific assets. Williamson also identifies three broad types of governance structures i) the market, which is non-transactions-specific ii) transaction-specific governance that are adapted to the special needs of the transactions and iii) transactions-semi-specific, which fall in between. According to Williamson, transactions and governance structures are aligned in order to economize transaction costs.

Although the transaction costs theory addresses some of the weakness of the neoclassical theory, it is not without its critics. First, it begs the question of how profit maximization that is costs minimization is

achieved. Even if transaction costs theory assumes asymmetries of information, it still neglects the conflict of interests between economic actors and agency costs. Finally, it does not allow for firm evolution.

### **2.3 The principal agent theory of the firm**

In the principal agent theory (Jensen and Meckling, 1976), the firm is conceived as a nexus for a set of contracting relationships among individuals. As the neoclassical theory, it is based on the principle of maximizing behaviour on the part of all individuals. Yet, an individual aims at maximising his own utility and this may generate conflicts of interest between different economic actors.

In particular, the principal agent theory focuses on the contracts between the owners and managers of the firm and investigates the efficiency of the separation of ownership and control as a form of organization. The agency relationship involves the principal, which is the owner and risk bearer of the firm, and the agent, which is the manager and the decision maker. As both of them are utility maximizers, the theory assumes that the manager will not always act in the best interests of the owner. The divergence between the agent's decision and the optimal decision from the principal's perspective of profit maximization engenders the agency costs related to the losses in profits and the monitoring expenditures by the principal, and to the bonding expenditures by the agent. Under these conditions, the principal agent theory investigates the incentives faced by both the principal and the agent within their contractual relationship. In particular, the literature has mainly focused on the incentive schemes that align the manager's objectives with the owner's interests.

This theory has some weaknesses. As the neoclassical theory of the firm, it still fails to define the boundaries of the firm. Moreover, it still mainly deals with static equilibrium analysis and thus does not allow for firm evolution.

### **2.4 The resource based view and the evolutionary theory of the firm**

The resource-based theory analyses the firm from the resource side rather than the product side. The idea of looking at the firm as a set of resources has its roots in the work by Penrose (1959) and emphasizes the role of critical resources in shaping firms' evolution and growth (Rumelt, 1984; Teece, 1984; Wernerfelt, 1984; Dierickx and Cool, 1989; Barney, 1991). As the transaction costs theory, the resource based view looks inside the black box, in particular, by focusing on the resources it owns and assumes bounded rationality. Yet, it is based on the knowledge based approach rather than the opportunistic-based view (Conner and Prahalad, 1996).

According to the resource-based view of the firm a critical resource can be either a person or a specific asset that cannot be easily imitated and differentiates a firm from its competitors. A number of works has pointed out that knowledge, skills and experience are the major source of sustainable competitive advantage and new opportunities exploitation (Winter, 1987; Prahalad and Hamel, 1990).

In line with this theory, Teece et al. (1997) has developed the concept of dynamic capabilities referring to the ability of adapting organizational skills, resources and competences to changing environment. "Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions" (Teece et al. 1997, p. 516).

The evolutionary theory of the firm offers an alternative definition of the firm based on routines. In the evolutionary theory proposed by Nelson and Winter (1982), the firm is still motivated by profit as in the neoclassical view yet it is not analysed in equilibrium conditions but it is assumed to operate in an open

ended dynamic process. In this view a firm can be defined through the set of routines and competencies that the firm encompasses. As routines and competences are firm specific and differ among different firms, the evolutionary theory conceives firms as heterogeneous economic agents. In order to survive, heterogeneous firms compete in the market by employing new techniques and producing at lower costs than their competitors. Firms evolution is thus driven by technological competition and selection mechanisms, on one hand, and innovation processes, on the other hand.

While addressing some of the issues related to the more traditional theories, the resource-based and the evolutionary theories have their own limitations. Although the resource based view looks inside the black box in terms of the resources it owns, in the evolutionary theory the firm still a black box. The boundaries of the firm are still not defined and the issues related to the separation of ownership and control are not accounted for.

### **3 The European Firm: an open debate**

Most of the theories of the firm reviewed so far share a common limit which has somehow influenced the debate on the more appropriate organization of production in modern capitalistic societies. They indeed end up to propose, more or less explicitly, a sort of ideal organizational structure in the continuum between markets and hierarchies, on the basis of the comparison between specific advantages and disadvantages.

On the one hand, earlier approaches view the firm as a nexus of contracts. The main pillars of the production process are therefore transactions carried out within market dynamics. In this direction, firms take the typical form expected in competitive markets and predicted by traditional neoclassical theories. On the other hand, subsequent schools of thought have emphasized the importance of information asymmetries and the risk for moral hazard and adverse selection in favoring the development of larger and vertically integrated production units (Williamson, 1975). In addition, the focus on differential objectives featuring owners and managers led to stressing the advantages of managerial firms, as different from those in which ownership and control are concentrated in the same persons (Jensen and Meckling, 1976).

The search for an archetypical organizational form also inspired empirical works in business history. The main reference is in this respect the voluminous works by Alfred Chandler (1962 and 1977). In his analysis of the co-evolution of organizational forms and western capitalism, Chandler stressed that the emergence of the diversified and multidivisional form could have been regarded as the heyday of the evolution of modern economies. While single and family owned businesses were mainly typical of the industries featuring the First Industrial Revolution, the Second one was instead characterized by the rise of chemical and pharmaceutical productions as well as the introduction of new technologies, like the electricity, that made production processes much faster and cheaper. The new industries were showed also peculiar technical features according to which the minimum efficiency scale was pretty high, partly as an effect of the sunk costs needed to implement effective factories. The prospects for scale and scope economies were therefore out of the main factors leading to emergence of large corporations in the Second Industrial Revolution.

Both Chandler and Williamson tended to represent the M-form typical of American capitalism as a superior form of organization. The former in particular proposed that there clearly was an increasing diffusion of such a kind of organization amongst most advanced economies. A convergence process was about to

display its effects, concerning the “type of enterprise and system of capitalism used by all advanced economies for the production and distribution of goods” (Chandler, 1992 [1984]: p. 156). This process of convergence was likely to interest both European and the Japanese governance of firms’ groups.

These latter, however, offered some years later the chance to extend and reshape the ongoing debate. The evidence about the peculiar organization of Japanese firms’ group typical of *keiretsu* systems did cast some doubts on the pretended universality of the American multi-divisional firm. The virtues of this governance scheme grounded on outsourcing, informal ties and the emphasis of core businesses were so evident that Williamson himself had to admit that the *keiretsu* organization could have been regarded as much effective as the M-form (Williamson, 1993).

On this bases, the *discourse* on the nature of European firms began to assume a different perspective, along with increasing awareness that different varieties of capitalism were possible (Hall and Soskice; xxx) and hence that different ways of organizing the production process could have co-existed at the same historical time, as an effect of different idiosyncratic characteristics featuring local contexts.

### 3.1 Role of the industrial structure

Such awareness could hardly be regarded as brand new achievement in economic theory. The link between the organization of production and industrial peculiarities were indeed already emphasized, for example, in the works by Alfred Chandler. International differences were regarded as sort of out-of-equilibrium situations, which however would have ended up to the ideal-form. The seminal contributions by two founding economists, i.e. Alfred Marshall and Simon Kuznets, may help enriching the framework.

Marshall’s masterpiece (1890) is famous for having set up the principles of partial equilibrium analysis as well as for having analyzed in detail the British production environment during the First Industrial Revolution. The celebrated concept of industrial districts originated therein, and has represented, and still represents, for some economists the best possible world towards which local production systems ought to converge, though Marshall’s analysis was positive rather than normative. His other important contribution *Industry and Trade* (1919) has been less fortunate, despite the richness and the broad empirical context of analysis. In this work Marshall carries out an interesting comparison among the sources of industrial leadership in Great Britain, France, Germany and United States, emphasizing the co-existence of different forms of business organization in different countries, as well as the importance of the institutional setting, like the access conditions to financial resources, fiscal policies and the degree of competition, besides the traditional influence of technical factors. Marshall’s work in sum contained all the ingredients for a ‘relativist’ theory of the firm, appreciating the importance of the specific features of industrial and geographical contexts.

A few years later Simon Kuznets (1930) proposed an interesting analysis of the cyclical behavior of industries, able to explain how the economic leadership moved from some countries to others according to the relative stage of lifecycles that characterizes the industries they are specialized in. Such evolution, mainly grounded on technological factors, is likely to explain for example the gradual shift of industrial leadership and the related effects on economic growth. Kuznets’ analysis enables to appreciate the dynamic character of economic structure. The performance of industries exhibit a cyclical behavior, and some countries are likely to take the lead at a given historical time, while some other ones are likely to replace them when their core industries undergo the phase of growth. Structural change is a key element of economic life. Along with Marshall’s remark on the close relationship between the organization of



production and the peculiarities of industrial sectors, such contributions allows for understanding how hard is to find out a unique firm model. On the contrary, there is a changing variety of industries, both across countries at the same time and over time within the same country. Each industry is likely to be characterized by a form of business organization that better fits with the features of production. This was explicitly advanced by Kuznets, who emphasized how in modern economies “Major aspects of structural change include the shift away from agriculture to non-agriculture pursuits and, recently, away from industry to services; a change in the *scale of production units*, and a related *shift from personal enterprise to impersonal organization of economic firms* (Kuznets, 1973: p.248, italics added). For this reason the search for an ideal firm form would appear an abstraction too far from what can be empirically observed.

### 3.2 Innovation and path-dependence

The interest in the dynamics of structural change can be regarded as a distinctive feature of the intellectual climate established in the 1930s in the fields of economics. Shortly after Kuznets’ book, Joseph Schumpeter published indeed the *Business cycle* (1939), in which he treated to a great extent the intertwining between industrial and technology lifecycles. The dynamics of technological change is at the same time both a determinant and an outcome of economic dynamics. As a scholar of economics of innovation, Schumpeter provided both theoretical and empirical contributions that are pretty consistent with the criticism of the universalist approach typical of the supporters of the M-form.

In his *Theory of Economic Development* (1912), he proposed indeed a taxonomy of innovations, out of which process innovations and, more explicitly, organizational innovation bear precisely on the way in which firms carry out the production process. Schumpeter maintained that the organization of production is subject to change, and that the changes in the institutional and economic environment in which firms operate are likely to influence such dynamics. All the more, his works are a clear clue of this process. Indeed, in the above mentioned book Schumpeter identifies the entrepreneur as the main engine of economic growth. The small family-owned company, built around an innovative idea, represents the desirable organizational form. The access to credit, in particular thanks to the bank system, is in turn an key enabling condition. Later on, in *Capitalism, Socialism and Democracy* (1942), Schumpeter changed his mind, stressing how it is the large and monopolistic firm to provide the economy with the necessary impulse to change and growth. A temporary monopoly is necessary according to Schumpeter in order to guarantee sufficient extra-profits for firms having invested large amounts to resource to research and development. The financing of innovation becomes more an internal business rather than an activity sustained by external credit.

Schumpeter’s works therefore show how interpretative lens are strictly related to the *esprit du temps*. Different organizational forms appear to be equally effective, depending on the features of the actual economic and institutional environments. His works also point to the importance of history in economics, and therefore to need for an evolutionary approach to economics. The conditions in which economic agents operate are far from static and immutable, but economic agents make their plans on the basis of the actual observed parameters. Therefore, when conditions change, agents react by introducing different kinds of innovation in their daily business (Schumpeter, 1947). Organizational innovation is out of the possible outcomes.

In this direction the M-form is only one of the possible organizational forms, which is strictly related to the set of idiosyncratic features impinging upon specific industrial and geographical contexts at given moments in time. The economics of path-dependence provides insightful complementary inputs in this respect. A path dependent process is one in which remote events, both systematic and stochastic, can exert important influences on the final outcome. Stochastic processes not converging to single equilibrium are called non-ergodic. Within this framework, the set of historical accidents needs to be accounted for the purpose of economic analysis. A path-dependent process is therefore one in which multiple equilibria are possible, due to the essentially historical character of the dynamic process under scrutiny (David, 1985).

The economics of path-dependence has been successfully applied to the analysis of innovation and integrate in the localized technological change approach (Antonelli, 1995 and 1999). The basic ingredients of this framework are well suited to provide further theoretical support to the idea that it is quite difficult to expect business organization to converge to a fixed-point distribution of outcomes. On the contrary, the dynamics of economic processes is such that the observed outcome at a given point in time is the result of a sequence of actions, according to which each action at time  $t$  is likely to shape actions at time  $t+1$ , raising a chain of unpredictable events. Social actions happen in time and space, so that the observed mix of path-dependent outcomes observed in a specific place is likely to be different from others in place elsewhere. Localization matters along with history. Different regions may therefore be characterized by idiosyncratic factors, within which one can include also the prevalent organizational form of enterprises.

It is clear that in this context the concept of ideal-type firm is meaningless. The question as to what should be the organizational form towards which European firms should converge can only be solved by accepting that there may be a variety of locally optima equilibria, which are difficult to predict ex-ante as they are the result of a long lasting evolutionary process.

### 3.3 Societal contingency and societal choice

The discussion conducted so far has showed that, besides more traditional approaches proposing the adoption of a “Pareto superior” business form, different approaches grounded in economic history and economics of innovation articulated a set of arguments which implicitly questioned the idea of a globally optimum organization of production, and therefore the idea itself of a possible European firm. However, such an issue has been explicitly tackled only recently by economic scholars.

The volume by Withley and Krinstensen (1996) represents a key reference in this respect. The book collects different chapters developing a theoretical framework supporting a contingent approach to the issue in the first part, and then provides an application to the investigation of the main organizational forms characterizing different European countries.

The arguments set forth in *The Changing European Firm* are grounded on an institutional approach to economics. Economic agents are therefore not characterized by complete rationality and profit-maximizing behavior. On the contrary, the economy is viewed as a web of relationships between different kinds of institutional actors with diverging interests, in which agents’ rationality is bounded to a limited portion of the whole set of knowledge. Learning plays a key role in order to fill relevant gaps, so that individuals are able to adapt to changing conditions of economic environment.

Within this framework, the baseline hypothesis impinges upon two main pillars. On the one hand, the *societal-contingency approach* (Sorge, 1991; Withley, 1994) represents an application of the general

contingency theory, according to which effectiveness depends on fit with critical contingencies. In this direction, firms may develop specific organizational forms due the peculiar features of main institutions affecting economic behavior, like local labor markets, the rigidity of financial markets and the quality of ownership and management systems. The design of such institutions may be such to override more universalistic industry or technological factors. It follows that it would be pretty difficult to observe a shared consensus on the most effective organizational form amongst such heterogeneous contexts like European countries are. It is indeed more reasonable to expect that dominant patterns of business organization vary widely from country to country, or from one business system to another.

On the other hand, within the institutionalist approach, the *societal-choice* view argues that while societal-contingency correctly push to focus the attention on the key role of institutional variety, this is not sufficient enough to gain a full understanding of the economic reality. The persistence of the holding company across different countries indeed call for additional explanations, able to explain the reasons why different institutional contexts might be characterized by similar dominant organizational forms. In particular, scholars within this framework put forth the need for a more pluralistic approach focusing also on the features of economic agents besides those of the institutional settings in which they operate (Whittington, 1992).

Each context is characterized by a variety of actors, which differ on the basis of motivations and targets, as well as in terms of their relative power within the local socio-economic system. The distribution of power amongst economic actors may engender choices which do not follow exactly capitalistic rules. Different 'sociological' groups may be identified, like the entrepreneurs, the banks, the families and the State. On the basis of their relative strength, these actors may choose strategies better suiting their own purposes, even at costs of economic efficiency. This is a possible explanation for the survival of some specific organizational forms in contexts the institutional setting of which would be better suited to host different designs.

It is clear that such set of arguments is enriched by a multidisciplinary approach in which institutionalism is blended with economic sociology. The concept of *embeddedness* seems to be particularly appropriate in this context (Granovetter, 1985). According to this, economic action is likely to be influenced by concrete personal relations and by their structures. The structure of relations are represented as a network in which economic agents are connected to one another. If one allows for variety, rather than assuming a representative economic agent, such networks turn out to be made of different actors, pursuing different objectives and with different relative weight.

The European firm issue can therefore be framed in the light of embeddedness theory. This would allow for better understanding the bidirectional flow of interactions from the network to the agent and vice versa. The relationships between the structure of the network and the features of the nodes it is made of, opens up a new perspective on the topic implemented on concepts and methodologies typical of complexity theory.

## **4 A complexity perspective to addressing the European Firm issue**

Complexity is emerging as a new unifying theory to understand endogenous change and transformation across a variety of disciplines, ranging from mathematics and physics to biology. The application of the basic tools of complex system analysis to social sciences has recently lead to increasing attempts to

implement an actual economics of complexity (Arthur, Durlauf, Lane, 1997). A complex system may be defined as a system that comprises many elements that interact richly (Simon, 1966; Kauffman, 1993).

One can articulate the idea that the organizational form taken by firms is an emergent property of a system characterized by organized complexity. According to the theory of complexity, emergence is a phenomenon whereby aggregate behaviors that arise from the organized interactions of localized individual behaviors, provide both the system and the agents with new capabilities and functionalities. By organized complexity we mean a system in which “interactions are not independent, feedback can enter the system. Feedback fundamentally alters the dynamics of a system. In a system with negative feedback, changes get quickly absorbed and the system gains stability. With positive feedback, changes get amplified leading to instability” (Miller and Page, 2007:50).

The implementation of such view allows to appreciate the important role of the properties of the system into which firms originate and develop. In other words, considering the organizational form as an emergent property of socio-economic systems is strictly related to the issue of embeddedness. An analysis of the complex dynamics of European firms should move from a clear definition of the system in which firm operate. In this system:

- Economic agents are heterogeneous, which are interconnected and networked with other agents in the system in order to exploit complementarities and interdependence.
- The heterogeneous agents are firms and also public and private institutions and organizations.
- Each agent is a network of resources and competences.
- The emergence of organizational forms stems from intentional choices by economic agents.
- The structure of the system change endogenously.

Consistently with the institutionalist approaches discussed in the previous section, the quality of institutions, as well as the different features characterizing economic agents are likely to explain the persistence of different type of firms across different countries in Europe. Institutions, families, banks, financial and factor markets, are the typical nodes of a network of relationships within which firms carry out their business. The architecture of such network, in terms of both distribution of links and relative importance of nodes, is likely to shape emergent properties of system dynamics.

The complexity view may be pushed even further, by adopting the competence view of the firm, as introduced by Penrose and further implemented in the capability approach. The firm itself can be viewed as a bundle of networked resources, out which there are production resources, management, ownership, and so on and so forth. The way in which these components are linked one another, as well as the relative weight of some of them, can be thought as features characterizing the structure of the firm as a network<sup>1</sup>.

The system dynamics of the components that constitute the firms leads to emergent properties which are the performances of firms themselves. Firms performances are however a sort of feedback that the firms

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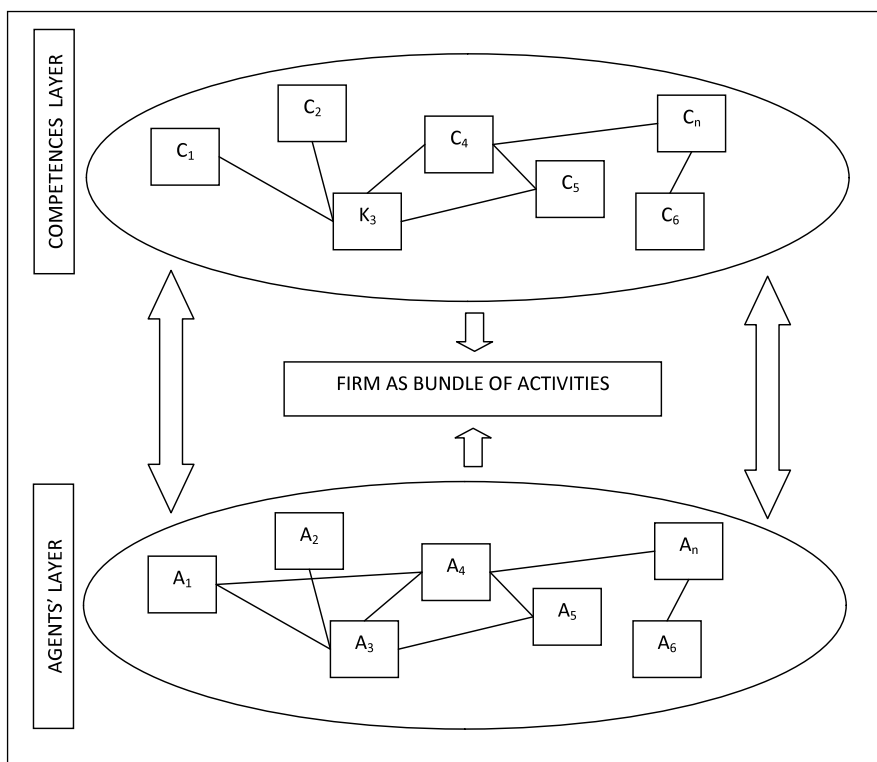
<sup>1</sup> The concept of firm as a network is not new (see for example Antonelli, 1987), but it has not received adequate consideration from a theoretical viewpoint. The grafting of the complexity theory in the theory of the firm could take great advantage from such a conceptualization.

send to the system in which they operate, which in turn shape the organization of the firm and eventually its performance again. It follows a circular process, shaped by powerful self-enhancing dynamics.

The issue would be relatively simple if one would assume the structure of the networks, the socio-economic system and the bundle of firms' capabilities, as stable over time, or at most affected by exogenous change, like most of the complexity thinking assumes. Yet, the architecture of a complex system may well change over time, and so may the structure of epistatic relationships. This may occur either due to a change in the relative weight of some elements in the system, these elements switching from a non-influential to an influential position, or by means of introduction of new elements within the system. This is in turn likely to alter the existing structure of relationships. Within this context, the pleiotropy represents the number of elements in the system that are affected by the appearance of new elements. It is clear that the higher the pleiotropy, the greater the change in the architecture of the system that the inclusion of new elements may engender.

The model of constructional selection by Altenberg (1994 and 1995) represents one of the few attempts to cope with the issue of changing architectures of complex systems. Such class of models is well suited to investigate the evolution of organizational forms considered as artefacts made of interdependent elements (Lane and Maxfield, 2005). The viewpoint of endogenous complexity makes the analysis of organizations particularly appealing and challenging. The structure of the firm can indeed be represented as an emergent property stemming from *multi-layered complex dynamics* (see Figure 1). In other words, the adoption of an endogenous complexity made possible by this approach allows for the combination of the view on the firm as an artefact with the view of firm as an act, i.e. as the product of collective actions involving agents with converging incentives and aligned interests (Arthur, 2009; Lane et al., 2009).

**Figure 1**



The structure of the network of relationships amongst interacting agents represents therefore a crucial factor able to shape the ultimate layout of organizational forms. Constructional selection matters, in that

new institutions entering the network need first of all to choose with which incumbents they want to be linked with. The concept of preferential attachment applies to this situation. In a wide number of contexts, the new nodes in a network generally end up to link with those 'old' nodes already characterized by a large number of connections (Barabasi and Albert, 1999). As a consequence, the entrance of new actors in the network is likely to reshape the relative weight of nodes, and hence modify the structure and the balance of relationships.

Organizations so achieved stems from the combination of competences dispersed among socio-economic agents. They may be thought about as a collection of elements linked one another. The firm can be therefore imagined as a network in which the nodes are competences or organizational units and the links represent their actual combination. Organizational forms in this sense turn out to be an emergent property of complex dynamics featuring the interdependent elements of the system.

This is a quite unexplored consequence of the approach to the European firm as a emergent property stemming from qualified interactions, which provides further richness to its dynamics. Each organizational form may be represented as a network the nodes of which are smaller units while the edges stand for their actual combination. Hence each organization is characterized by a structure with its own architecture. This in turn may evolve over time, as an effect of the introduction of new nodes and the consequent change in their relative weight within the network.

Dynamic irreversibility and path-dependence represent a channel through which the topology of organization structure affects the dynamics at the level of agents networks. The organization of production is localized as an effect of the interactions between the complex dynamics at the agents' level. However the topology of the structure of socio-economic system is in turn shaped by the choices made at the competence level as to which resources combine together and in which way. A self-sustained process is likely to emerge, according to which the organization of production tends more and more towards a local attractor in which they are locked in. The changing European firm can be therefore represented as a distribution of local attractors across different localized contexts shaped by idiosyncratic factors, wherein the changing conditions both in the socio-economic system and in the architecture of firms' structure itself is likely to produce variations over time.

At a given time, firms can select among multiple outcomes. Their location choice can be directed towards different places and is influenced by both their internal characteristics that include the preceding path and external characteristics that depend on the location strategies of other agents carried out in the past. Hence the concentration of different forms of organizations in different places stemming from the idiosyncratic factors of the local attractor is a path dependence process.

A number of emergent properties or conditions of the local system can make a place in space more attractive than others. The interaction and networks of local actors that allow for the exploitation of complementarities and interdependences, reinforced by the technological and industrial specialization of the area, the institutional endowment and by a common local culture of trust, based on shared practices and rules, are centripetal forces that make a base of attraction of the local system. However, it is not only the local attributes or conditions but rather the sequence of cumulative interactions between them and positive feedbacks that give rise to a local complex system. Both local attractiveness and accidental historical order of choice generate agglomerations (Arthur 1989, 1994).

Once the local attractor has emerged following a path dependent process, heterogeneous agents within it are subject to self-reinforcing mechanisms. The process of increasing returns is self-reinforcing since the

benefits of remaining into the current path are higher than the cost of switching to an alternative path. Localized increasing returns operate as a selection mechanism and favor the survival of firms and forms of organization that are well established in the local system. Thus, the generation of different forms of organizations is a persistent process.

The persistence of the actual forms of organisation takes place when the internal capabilities accumulated by means of learning processes lead to the generation and exploitation of new knowledge. Another fundamental condition to the organisational success is when the external context provides the access to complementary and indispensable inputs in terms of external knowledge and capabilities. The generation of new knowledge requires both internal learning and the acquisition of external tacit and codified knowledge.

Firms are attracted towards and remain locked-in the local attractor until the profits stemming from their activities are above the equilibrium one. The selection mechanism depends on the profits realized by each firm. Extra-profits and increasing returns engender positive feedbacks and self-reinforcing mechanisms that sustain firms' creative behaviour and competitive advantage. The attractiveness of a place persists as long as the returns stemming from complementarities and interdependence of capabilities and agents are positive.

New forms of organisation can emerge when firms within the local attractor understand that the benefits of remaining into the current organizational path, that in turn has engendered the current local attractor, are lower than the cost of shifting to an alternative path and, thus, to an alternative attractor. Firms are induced to react creatively to changing local conditions. The collective process of search for new capabilities may finally engender radical changes in the organisational paradigm and leads to Schumpeterian gales of creative destruction. Radical changes in the organisational paradigm make the system moves unpredictably and irreversibly away from the old local attractor. Positive feedbacks and network externalities sustain this process of change and define the basin of attraction of the new attractor.

## 5 Conclusions

The debate about the European firm has recently attracted the attention of economic scholars specializing in the theory of the firm. The baseline argument of the institutionalist approach to the issue states that it is very difficult and somewhat simplistic to expect firms in the European context converge towards a universalistic organization of production. The gradual thickening of the Single European Market, along with globalization of production, does not lead necessarily to the established of a sort of European version of the American M-form corporation.

The institutionalist approach, drawing upon contingency theory, shows how the evolution of firms' structure is embedded in the contexts in which they operate. The quality of institutions like capital markets, banks, rules and norms, labor markets and financial resources, is likely to exert a strong influence on the actual configuration of the organization of the production process. Moreover, the heterogeneity of economic agents, in terms of motivation and objectives, provides explanation for the observation of organizational forms hardly fitting with the environment in which they are placed. Economic agents, consistently with behavioral assumptions, are not characterized by perfect rationality and may want to pursue objectives which are different from profit maximization. That is why organizational forms which are not effective from an economic viewpoint may persist over time.

In this chapter, after having provided an overview on the 'theories' of the firm, we have showed that former contributions of main pillars of economic theory enable to get to the same conclusions. Both Marshall's and Kuznets' works, as well as the ones by Schumpeter, show that the evolution and diffusion of specific organizational forms are strictly related to industrial peculiarities and to the features of the context in which firms originate and develop. Such works appeared well before Chandler analyses supporting the idea of a universalistic organizational form, and yet have been mostly neglected by theorists of the firm.

The basic idea that different organizational forms may prove to be equally efficient, according to the nature of the contexts in which they operate, is very related to the concepts of multiple equilibria, dynamic irreversibilities and path-dependence. We have therefore proposed to extend to the theory of the firm the recent tendency to apply the tools and concepts of complexity theory to the understanding of the origins and evolution of organizational form. We have articulated an interpretative framework in which organizational forms are emergent properties stemming from qualified interactions at the agents levels. Organizations are in turn characterized by internal qualified interactions which feed back to agent levels. A multilayered representation has been proposed, with two-ways feedbacks flows, in which organizational change and institutional change are the endogenous result of complex system dynamics. We think this approach may be far reaching for a theory of the firm able to integrate both the variety of resources and activities which make up a firm and the variety of agents with which firms interact in their environment.



## 6 References

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